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Title: Evaluating the radioactivity and health risks in oil and gas production areas: insights from Titas Gas Field, Bangladesh

Abstract:

Conducting comprehensive studies of radioactivity and associated risk assessments in the oil and gas industry is crucial due to the potential accumulation of Naturally Occurring Radioactive Materials in production operations. This pioneering study investigates radioactivity levels in surface soil from the Titas Gas Field area in Bangladesh by a High Purity Germanium (HPGe) detector, a crucial resource of the nation's energy infrastructure. In surface soil, the activity of ^{226}Ra , ^{232}Th , and ^{40}K varied from 18–41 Bq/kg, 28–62 Bq/kg, and 280–600 Bq/kg, respectively. Particularly, the levels of ^{232}Th exceeded the global average value for soil. These elevated ^{232}Th levels are likely attributed to a combination of natural geological processes of enriching thorium bearing minerals, geochemical processes favouring thorium retention and human activities selectively impacting these radionuclides. The estimated of radiological risk reveals that some indices exceed recommended limits, hence pose a concern for public health. The study recommends periodic monitoring, public awareness campaigns, remediation efforts, and long-term management strategies to protect environmental and public health. The findings of this research underscore the critical need to recognise and address radiological hazards associated with gas extraction activities to safeguard the health and safety of workers and nearby communities in Bangladesh.

Keywords: Titas Gas Field, HPGe, Radiological, Radioactivity, NORMs

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